

Appln. No.: 10/774,023
Amendment Dated May 15, 2006
Reply to Office Action of February 15, 2006

MKPA-108US

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A method of aligning an input port of a first device, ~~the input port having a face,~~ to an output port of a second device, ~~the output port having a face,~~ using an alignment apparatus having a plurality of scan resolutions comprising lowest, intermediate, and highest settings, the input port having a face and the output port having a face, the method comprising the steps of:

- a) activating the second device to emit a signal via the output port;
- b) designating an alignment data point on the face of the output port;
- c) initializing a current setting of the scan resolution to the lowest setting;
- d) designating at least three perimeter data points disposed around the alignment data point in a planar geometric configuration at respectively predetermined distances from the alignment data point according to the current setting of the scan resolution;
- e) obtaining a measure of alignment quality at the alignment data point by translating one of the face of the input port and the face of the output port with respect to another one of the face of the output port and the face of the input port to the alignment data point;
- ef) obtaining further measures of alignment quality at each of the perimeter data points by translating the face of the input port with respect to the face of the output port to each of the perimeter data points; and
- fg) aligning the face of the input port to the alignment data point having a highest measure of alignment quality;
- h) designating a new alignment data point at one of the alignment and perimeter data points having the highest measure of alignment quality;
- i) setting the scan resolution to a higher setting if the new alignment data point is at the same location as the alignment data point and if the current setting of the scan resolution is not at the highest setting after step h; and
- j) repeating steps d-i, wherein the at least three perimeter data points are disposed around the new alignment data point.

2. (Canceled).

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3. (Currently Amended) A method according to claim ~~[[2]]1~~, further comprising the step of repeating step ~~[[h]]i~~ until the highest measure of alignment quality is greater than a threshold value.

4. (Canceled).

5. (Currently Amended) A method according to claim ~~[[4]]1~~, further comprising the steps of:

~~f2i1~~) setting the scan resolution to an intermediate setting if the current setting of the scan resolution is at the highest setting and if the alignment quality at the alignment data point has a value within an intermediate threshold range;

~~f3i2~~) setting the scan resolution to the lowest setting if the current setting of the scan resolution is at the highest setting and if the alignment quality at the alignment data point is less than a lowest threshold.

6. (Currently Amended) The method according to claim 5, wherein step ~~f3i2~~ further includes a plurality of intermediate settings each having a respective threshold range.

7. (Currently Amended) A method of aligning an optical fiber to a first device using an alignment apparatus having a plurality of scan resolutions comprising lowest, intermediate, and highest settings, the first device having an optical output port, the output port having a face, the method comprising the steps of:

a) designating a center alignment point on the face of the optical output port;

b) activating the first device to emit an optical signal via the optical output port;

c) Initializing a current setting of the scan resolution to the lowest setting;

ed) designating four vertex alignment points on the face of the optical output port, the vertex data points being disposed around the center alignment point in a substantially diamond planar configuration at respectively predetermined distances from the center alignment point according to a scan resolution having a the current setting of the scan resolution;

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de) aligning the optical fiber and the optical output port to the center alignment point and to each of the vertex alignment points to obtain five respective measures of alignment quality;

ef) determining a greatest measure of alignment quality among the five measures of alignment quality and designating the respective alignment point as a new center alignment point;

g) setting the scan resolution to a higher setting if the new center alignment point is at the same location as the center alignment point and if the current setting of the scan resolution is not at the highest setting; and

fh) repeating steps b-[[e]]g, wherein the four vertex alignment points are disposed around the new center alignment point.

8. (Currently Amended) The method of claim 7, wherein step d-e obtains the five respective measures of alignment quality by moving the optical fiber with respect to the optical output port.

9. (Currently Amended) The method according to claim 7, wherein step d-e obtains the five respective measures of alignment quality by moving the optical output port with respect to the optical fiber.

10. (Canceled).

11. (Currently Amended) A method according to claim [[10]]Z, further comprising the steps of:

e2g1) setting the scan resolution to a lower setting if the current setting of the scan resolution is not at the lowest setting and if the alignment quality at the center alignment point has a value within a threshold range of the lower setting;

e3g2) setting the scan resolution to the lowest setting if the current setting of the scan resolution is at the highest setting and if the alignment quality at the center alignment point is less than a lowest threshold.

12. (Currently Amended) The method according to claim 11, wherein step e2-g1 further includes a plurality of lower settings each having a respective threshold range.

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13. (Withdrawn) An apparatus for aligning an optical input port having a face with respect to an optical output port having a face, the apparatus comprising:
an X-Y linear table for moving one of the optical input port and optical output port with respect to the optical output port and optical input port, respectively;
an optical power meter for obtaining measures of alignment quality of the optical input port to the optical output port;
a controller for
directing movement of the X-Y linear table,
comparing respective measures of alignment quality from the optical power meter at different relative positions of the optical input port and the optical output port,
initializing and changing a scan resolution setting, and
designating and updating the respective relative positions of the optical input port and optical output port according to the scan resolution setting and comparison of the measures of alignment quality.

14. (Withdrawn) An apparatus according to claim 13, further comprising means for collecting and displaying measures of alignment quality, the scan resolution setting, and the respective relative positions of the optical input port and the optical output port, wherein the controller is a manually operated controller.

15. (Withdrawn) An apparatus according to claim 13, wherein the optical input port is an optical fiber and the optical output port is a semiconductor laser.

16. (Withdrawn) An apparatus according to claim 13, further comprising memory for storing measures of alignment quality at the respective relative positions of the optical input port and the optical output port.

17. (Currently Amended) A method of aligning an optical fiber to a laser diode output face using an alignment apparatus having a plurality of scan resolutions comprising lowest, intermediate, and highest settings, the method comprising the steps of:

- a) initializing a current setting of scan resolution to ~~a~~ the lowest setting;
- b) activating the laser to emit an optical signal;

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- c) translating the optical fiber along the laser diode output face from a starting position along a path until a first light signal is detected;
- d) designating a current alignment point on the laser diode output face at the location of the first light signal;
- e) designating four vertex alignment points on the laser diode output face, the vertex alignment points being disposed around the current alignment point in a diamond planar configuration at respectively predetermined distances from the current alignment point according to the current setting of scan resolution;
- f) aligning the optical fiber to the current alignment point and to each of the vertex alignment points to obtain five respective measures of alignment quality;
- g) determining a greatest measure of alignment quality among the five measures of alignment quality and designating the respective alignment point as a new current alignment point;
- h) setting the scan resolution to a higher setting if the new current alignment point is at the same location as the current alignment point and if the current setting of scan resolution is not at ~~a~~ the highest setting;
- i) setting the scan resolution to ~~an~~ the intermediate setting having a respective intermediate threshold range if the current setting of scan resolution is not at the lowest setting and if alignment quality at the current alignment point is less than a respective intermediate threshold range;
- j) setting the scan resolution to the lowest setting if the current setting of scan resolution is at the highest setting and if alignment quality at the current alignment point is below a lowest threshold; and
- k) repeating steps d-k, where n the four vertex alignment points are disposed around the new current alignment point until the greatest measure of alignment quality is greater than a predetermined value.

18. (Original) The method according to claim 17, wherein step i sets the scan resolution to one of a plurality of intermediate settings, each setting having a respective intermediate threshold range.